EFFECTS OF VARIATIONS IN GIN AND MILL CLEANING ON THE LINT AND YARN QUALITY OF MECHANICALLY PICKED AND STRIPPED COTTONS

UNITED STATES DEPARTMENT OF AGRICULTURE

MARKETING RESEARCH REPORT NUMBER 1095

PREPARED BY SCIENCE AND EDUCATION ADMINISTRATION

INTRODUCTION

n 1979, the Lawrence Soil and Water Conservation District), in cooperation with the USDA, Soil Conservation ce (SCS) took part in the National Resources Inventory . Data was collected on 224 sample units in the county ovide county reliable resources information. Each sample is 160 acres in size.

his inventory provides natural resource data on (1) land (2) conservation treatment needs, (3) prime farmland, (4) cial cropland, (5) sheet and rill erosion, (6) floodprone (7) wetlands, and (8) small bodies of water.

he study identified erosion and land management problems wrence County. These problems are addressed in the ct's program with such goals as: (1) reducing erosion h technical assistance on cropland, pastureland, and woodland, and (2) assisting in the reclamation of strip land causing on and offsite hazards.

he purpose of this publication is to distribute the s of the Lawrence County Resources Inventory and to e land users with a management guide for solving the n problems on the various soils in the county.

e information in this publication, like all information ped from a statistical study, has varying degrees of ility or confidence levels. All values expressed here, enting over 10 percent of the county area, have a confi- level greater than 90 percent or they are at least 90 t accurate. Smaller values, those representing less 0 percent of the total county area, will be less than 90 t accurate.

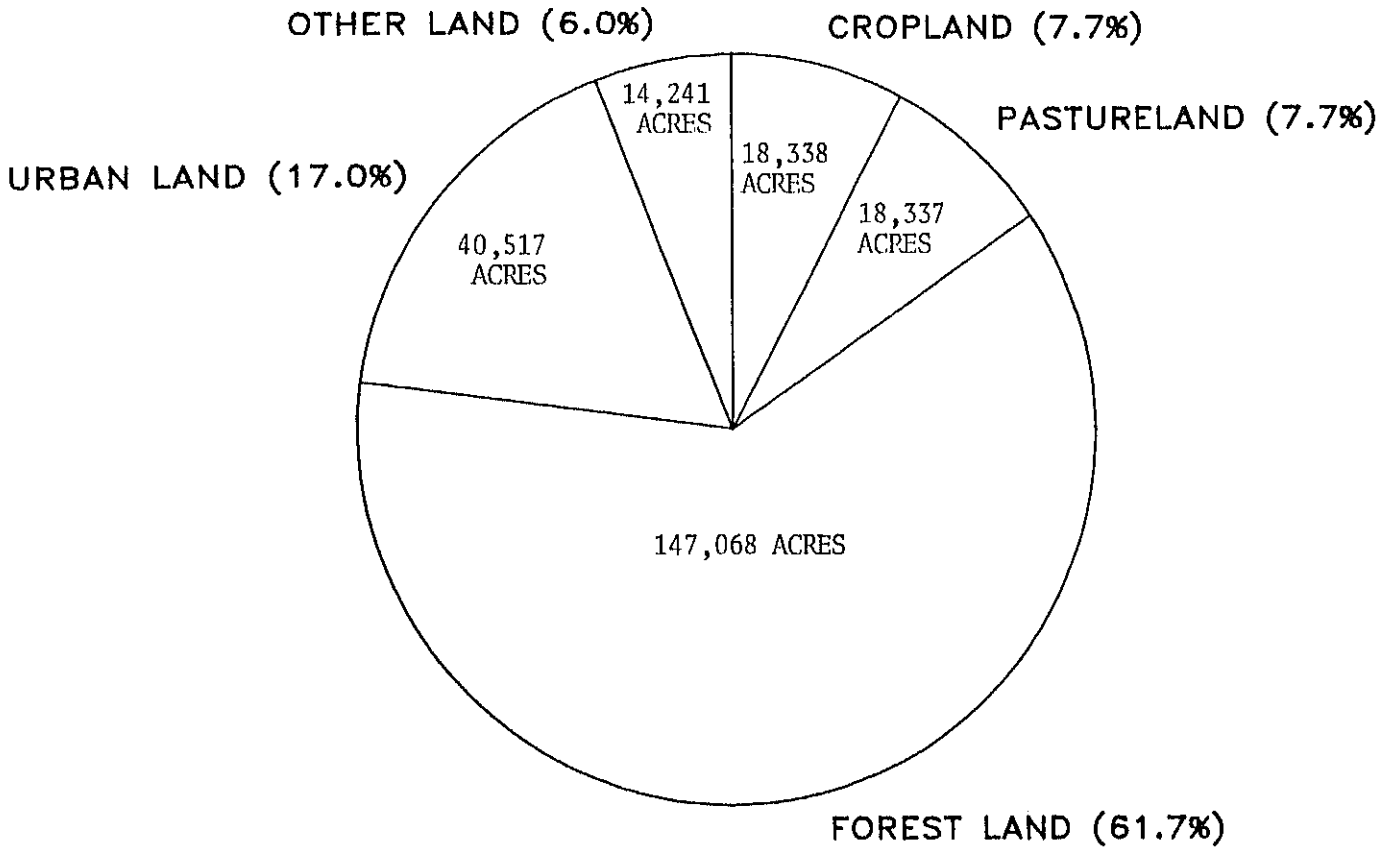
January 1985

RESOURCE ASSESSMENT OF LAWRENCE COUNTY LAND USE

Forestry and agriculture are the primary land uses in the county. Eighty-four percent of the 147,068 acres of forest land in Lawrence County is not grazed. The agricultural land is split between pastureland and cropland, with 50 percent of the cropland in hayland and 42 percent in cultivated crops. There are approximately 18,337 acres of pastureland which makes up eight percent of the total acres in the county.

There are approximately 4,370 acres of unreclaimed strip mined land in the county which was mined prior to adoption of the 1972 reclamation laws. These areas are highly erodable and produce large quantities of sediment downstream.

Figure 1.1 Lawrence County Nonfederal Land Use



TOTAL NONFEDERAL ACREAGE IN LAWRENCE COUNTY = 238,501 ACRES

KEY POINT:

o Over 147,000 acres or 62 percent of the county is forest land.

Land Use by Capability Class

Soils can be classified in a number of ways. The USDA, Soil Conservation Service, uses a land capability classification system that groups soils on the basis of their ability to produce common cultivated crops and pasture plants without soil deterioration. The grouping does not take into account major and generally expensive landforming operations that would change slope, depth or other characteristics of the soil and does not take into consideration possible but unlikely major reclamation projects.

Capability classes are designated by Roman numerals I through VIII. The numerals indicate progressively greater limitations and narrower choices for practical use. The classes are defined as follows:

Class I soils have few limitations that restrict their use.

Class II soils have moderate limitations that reduce the choice of agricultural use.

Class III soils have severe limitations that reduce the choice of agricultural use.

Class IV soils have very severe limitations that reduce the choice of plants, or that require very careful management, or both.

Class V soils are not likely to erode but have other limitations.

Class VI soils have severe limitations that make them generally unsuitable for cultivation.

Class VII soils have very severe limitations that make them unsuitable for cultivation.

Class VIII soils and miscellaneous areas have limitations that nearly preclude their use for commercial crop production.

Each capability class, except Class I, has subclasses to identify specific limitations. The letter "e" stands for erosion risk; "w" for wetness; and "s" for soils limited mainly because they are shallow, droughty, or stony.

Seventy-two percent of the total acres used for cropland are in Classes I and II, with the majority of the acres in Class II. Sheet and rill erosion is the greatest potential hazard to the majority of the cropland. Poor surface and subsurface drainage is also a significant problem on some of the Class II and III soils. Poor drainage, steepness of slope and the shallowness of the soil are the primary limitations on non-agricultural land uses, including homesites, parks, and septic tank developments.

Table 1.1 Nonfederal Rural Land Use Acreage by Capability Class

CLASS	CROPLAND[1/] Acres	PASTURELAND Acres	FOREST LAND Acres	OTHER LAND Non Urban Acres	TOTAL
I	4,401	0	734	0	5,135
II	8,802	1,100	1,100	1,100	12,102
III	1,100	366	1,100	734	3,300
IV	1,100	6,602	32,641	366	40,709
VI	2,201	8,436	86,555	4,558	101,750
VII	734	1,833	24,938	1,197	28,702
VIII	0	0	0	599	599
NA	0	0	0	5,687[2/]	5,687
TOTAL	18,338	18,337	147,068	14,241	197,984

KEY POINTS:

- o Seventy-four percent of all rural land in Lawrence County is in forest land.
- o Forty-eight percent of all cropland is Class II.
- o Eighty-two percent of all pastureland is Class IV and Class VI.
- o Ninety-eight percent of all forest land is located on steeper slopes in Classes IV, VI, and VII.

1/ Also includes all hayland.

2/ Acreage includes roads and small built-up areas.

Prime Farmland

Prime farmland is one of several kinds of important farmlands defined by the U.S. Department of Agriculture. It is of major importance in providing the Nation's short and long range needs for food and fiber. Prime farmland soils are defined as the soils that are best suited for producing food, fiber, forage, feed, and oilseed crops. Such soils have properties that are favorable for the economic production of sustained high yields of crops. Prime farmland soils produce the highest yields with minimal inputs of energy and economic resources. Farming these soils results in the least damage to the environment.

Prime farmland is also the easiest and least costly to develop for non-agricultural uses. Urbanization and other land uses have the potential to consume significant areas of prime farmland. Decisions need to be made at the local level to protect these lands from conversion to non-agricultural uses.

Table 1.2 Prime Farmland by Rural Nonfederal Land Use

LAND USE	TOTAL ACRES	PRIME FARMLAND	
		Acres	Percent
Cropland	18,338	11,001	60
Pastureland	18,337	733	4
Forest Land	147,068	1,468	1
Other	14,241	0	0
TOTAL	197,984	13,202	7

KEY POINTS:

- o Prime farmland makes up seven percent of all rural land and 60 percent of all cropland.
- o Eighty-three percent of all prime farmland in the county is currently on cropland.

Soil Erosion

Soil erosion is a continuously occurring natural process that loosens and transports soil particles. It is very slow on undisturbed woodland and areas with adequate permanent vegetative cover. Soil losses are quite high on sloping cropland that is continually cultivated without adequate conservation treatment.

Annually 542,890 tons of topsoil are eroded from agricultural land in Lawrence County. The highest erosion rates of all agricultural land occur on cropland and grazed forest land.

Table 1.3 Acres and Annual Erosion by Nonfederal Land Use

LAND USE	ACRES	TONS	TONS/ACRE
Cropland	18,338	59,172	3.23
Pastureland	18,337	52,353	2.86
Forest Land			
Not Grazed	124,329	356,471	2.87
Grazed	22,739	74,894	3.29
TOTAL	183,743	542,890	2.95

Soils can tolerate small amounts of erosion and remain productive for agriculture indefinitely. When erosion is above this tolerable limit the soil resource base cannot be maintained and the future ability of the soil to produce crops is threatened. This tolerable limit ("T" factor) ranges from three to five tons per acre per year for the soils in Lawrence County.

Table 1.4 Estimated Acres of Cropland, Pastureland and Forest Land in 1979 With a Soil Loss Over "T" on Nonfederal Land

LAND USE	ACRES OVER "T"	PERCENT OVER "T"
Cropland	4,399	24
Pastureland	5,136	28
Forest Land		
Not Grazed	42,542	34
Grazed	8,802	39
TOTAL	60,879	33

Conservation Treatment

Fifty-seven percent of all rural nonfederal land in Lawrence County needs some type of conservation treatment. Eighteen percent of the cropland needs erosion control practices to stabilize the soil. Twelve percent of the cropland needs some type of drainage system. Some of the cropland needs both erosion control practices and drainage.

Conservation treatment is needed to protect and improve pasture quality. Fifty-two percent needs improved management. Proper management includes the application of lime and fertilizer, rotational grazing, deferred spring grazing until the soil is firm, and reestablishment of vegetation as needed.

Conservation treatment is needed on 58 percent or 85,456 acres of the county's woodland. Livestock exclusion is needed on 15 percent of the woodland. Erosion control measures are needed on 20 percent of the area. Establishment and reinforcement of stands is needed on four percent of the area. Timber stand improvement is needed to improve the quality and productivity of the forest land.

Conservation treatment is needed on 40 percent of other land which includes farmsteads, other land in farms, quarries, stripmines, and other land uses.

Table 1.5 Lawrence County Conservation Treatment Needs on Nonfederal Rural Land

LAND USE	TOTAL ACRES	TOTAL ACRES NEEDING TREATMENT	% TOTAL ACRES NEEDING TREATMENT
Cropland	18,338	5,500	30
Pastureland	18,337	15,403	84
Forest Land	147,068	85,456	58
Other Land	14,241	5,755	40
TOTAL	197,984	112,114	57

Potential for Conversion to Cropland

Presently nine percent of the land area in the county is cropland. Only three percent of the remaining rural land has potential to be converted to cropland. It is very unlikely that there could be a significant increase in the cropland acreage of Lawrence County.

SUMMARY

The largest single land use in Lawrence County is forest land. Fifty-eight percent of this forest land needs some type of conservation treatment. Pastureland and cropland each represent about eight percent of the County. Three times as many acres on pastureland are in need of conservation treatment than on cropland. Only seven percent of the County is prime farmland and most of it is currently in cropland. Other land which includes farmsteads, quarries, pits, stripmines, etc., makes up six percent of the county. Six percent of the rural land is floodprone, thus having severe limitations for homesites and urban development. Most of the floodprone land is in cropland.

TECHNICAL APPENDIX

Pastureland

Approximately eight percent of the land area in Lawrence County is used for pasture. Pasture plants commonly grown are red clover, alfalfa, bluegrass, ladino clover, orchardgrass, tall fescue, timothy and bromegrass.

The ability of a pasture to produce forage and protect the soil from erosion is influenced by the soil type, plant species, and the landowner's grazing and fertility management. Forage stands must contain adequate quantities of adapted species. Practices that contribute to good pasture management are rotation of pastures, deferred grazing, grazing in proper season to reduce compaction, weed and brush control, fencing, and application of appropriate amounts of lime and fertilizer. Strategically located water supplies are also essential to proper pasture management.

The most widespread problem causing erosion on pastures in the county is overgrazing. Overgrazing usually occurs during July and August when the cool season grasses become dormant. Overgrazing not only causes additional erosion, but also reduces the stand of the more productive forage species. Overgrazing can be prevented by adjusting the number of livestock to the production potential of the pasture. This can be accomplished by using supplemental forages, reducing the number of livestock, or increasing the productivity of the present pasture.

Erosion control is a major need because many of the soils used for pasture are steep and subject to erosion. Control of erosion is particularly important during seeding. Erosion can be effectively controlled at seeding time by the use of tillage operations that leave residue on the surface. No-till seeding with chemical weed control is the most effective technique to establish forages and minimize soil erosion.

The need for lime and fertilizer should be determined by soil tests and amounts should be supplied to meet the desired production level of the forage to be grown.

With the application of good management practices forage yields can be increased. This will also increase carrying capacity and potential income from pastureland in the county.

Forest Land

Approximately 147,000 acres or 62 percent of rural non-federal Lawrence County is forest land. The majority of the forest land is privately owned. The remainder is in public ownership.

Lawrence County is located in the central hardwood forest region where many different timber types occur on many different soil types. The soil type influences production potential and limitations of woodland sites and tree species. Most of the woodland occurs on steep and very steep soil. Oaks and hickories are the dominant tree species. Other common tree species include white ash, black cherry, sugar maple, beech, and native conifers. Pine plantations are also quite common. Trees such as sassafras, persimmon, and red maple are naturally reestablishing abandoned farmland.

Common woodland products of the area are lumber, veneer, pulpwood, cooperage, posts, poles, Christmas trees, maple syrup, and firewood. In addition to products, the woodlands provide places for recreation, excellent wildlife habitat, and watershed protection.

In some areas the woodland shows the results of mismanagement from poor harvesting practices, livestock grazing, and fire. Poor harvesting practices have caused severe erosion, usually of a short-term nature. Grazing livestock cause erosive conditions that last for a long time. Grazing destroys leaf litter, kills young trees, damages root systems, and compacts the soil resulting in less soil cover and increased runoff. Fire, especially repeated, also removes soil cover which increases runoff. Increased runoff and reduced soil cover can result in increased soil erosion, especially on steeper slopes.

Erosion reduces the volume of soil available for water and nutrient storage. The removal of the porous surface layer exposes the subsoil which is commonly less porous. This increases runoff and reduces water storage capacity resulting in reduced woodland production.

The lack of proper woodland management has been responsible for reduced quality and quantity of woodland products. With proper management practices the quality of the woodland and potential income can be increased. Proper management would include: livestock exclusion, timber stand improvement which would include grapevine control, thinning and pruning, fire control, and proper harvesting techniques.

Site preparation and planting of adapted tree species can be used to convert abandoned farmland to more productive woodland than would occur naturally and also in a shorter period of time.

In summary, woodlands are an important land use in Lawrence County. The potential exists for these areas to become even more economically important in the future. However, a good education and information program is essential to convince woodland owners that improved woodland management is necessary.